Claims

[c1]   A method of controlling an automotive vehicle having a turning radius comprising:

determining a hand wheel torque; and

applying brake-steer as a function of hand wheel torque.

[c2]   A method as recited in claim 1 further comprising determining a steering wheel angle, wherein applying brake-steer comprises applying brake-steer as a function of hand wheel torque and steering wheel angle.

[c3]   A method as recited in claim 1 further comprising determining a steering wheel angle direction, wherein applying brake-steer comprises applying brake-steer as a function of hand wheel torque, steering wheel direction and steering wheel angle.

[c4]   A method as recited in claim 1 wherein the steering wheel direction comprises an increasing direction and a decreasing direction wherein applying brake-steer comprises applying brake-steer using a first boost curve in the first direction applying brake-steer using a second boost curve in the second direction wherein the first boost curve is different than the second boost curve.

[c5]   A method as recited in claim 4 wherein the first boost curve comprises a non-linear-boost curve.

[c6]   A method as recited in claim 4 wherein the first boost curve increases brake-steer at a first rate for a first period of time, increases brake-steer at a second rate for a second period of time, wherein the second rate is greater than the first rate and increases brake-steer at a third rate for a third period of time wherein the third rate is less than the second rate.

[c7]   A method as recited in claim 4 wherein the second boost curve comprises a non-linear-boost curve.

[c8]   A method as recited in claim 4 wherein the second boost curve decreases brake-steer at a first rate for a first period of time, decreases brake-steer at a second rate for a second period of time, wherein the second rate is less than the first rate.

[c9]   A method as recited in claim 1 further comprising prior to applying brake-steer, comparing the steering wheel torque to a predetermined torque and when the steering torque is greater than the predetermined torque, performing the step of applying brake-steer, and when the steering wheel torque is below the predetermined torque not applying brake-steer.

[c10] A method as recited in claim 9 wherein the torque comprises an increasing torque and a decreasing torque and wherein applying brake-steer comprises applying brake-steer using a first boost curve during increasing torque and applying brake-steer using a second boost curve during decreasing torque wherein the first boost curve is different than the second boost curve.

[c11] A method as recited in claim 10 wherein the first boost curve comprises a non-linear-boost curve.

[c12] A method as recited in claim 10 wherein the first boost curve increases brake-steer at a first rate for a first period of time, increases brake-steer at a second rate for a second period of time, wherein the second rate is greater than the first rate, and increases brake-steer at third rate for a third period of time wherein the third rate is less than the second rate.

[c13] A method as recited in claim 10 wherein the second boost curve comprises a non-linear-boost curve.

[c14] A method as recited in claim 10 wherein the second boost curve decreases brake-steer at a first rate for a first period of time, decreases brake-steer at a second rate for a second period of time, wherein the second rate is less than the first rate.

[c15] A method as recited in claim 1 further comprising reducing the turning radius of the vehicle during applying brake-steer.

[c16] A method as recited in claim 1 wherein applying brake-steer comprises applying at least one brake at a first wheel to reduce a vehicle turning radius.

[c17] A method as recited in claim 1 wherein applying brake-steer comprises applying an increased drive torque to a second wheel.

[c18] A method as recited in claim 1 further comprising determining a speed wherein applying a brake-steer comprises applying brake-steer as a function of steering wheel torque and vehicle speed.

[c19] A control system for a vehicle comprising:
a steering torque sensor generating a steering torque signal; and
a controller applying brake-steer to a vehicle as a function of the steering torque signal.

[c20] A control system as recited in claim 19 wherein said controller applies brake-steer as a function of a vehicle speed.

[c21] A control system as recited in claim 19 wherein said

controller applies a brake to apply brake-steer.

[c22] A control system as recited in claim 19 wherein said controller applies a differential torque steer.

[c23] A control system as recited in claim 19 wherein said controller changes to a 4x2 mode from a 4x4 mode to apply brake-steer.

[c24] A method of controlling an automotive vehicle having a steering actuator having a lock position, said method comprising:

turning a hand wheel in a first direction until the steering actuator is in the lock position; and

initiating brake-steer on the vehicle in response to torque applied to the hand wheel.

[c25] A method as recited in claim 24 wherein initiating brake-steer comprises controlling a first vehicle wheel speed.

[c26] A method as recited in claim 24 wherein controlling the first wheel speed comprises braking the first vehicle wheel.

[c27] A method as recited in claim 24 wherein controlling the first wheel speed comprises applying a predetermined positive torque to a second wheel while braking the first wheel.

[c28] A method as recited in claim 24 wherein controlling the first wheel speed comprises applying a predetermined torque to the first wheel.

[c29] A method as recited in claim 24 wherein controlling the first wheel speed comprises applying a first predetermined torque to the first wheel and a second predetermined torque to a second wheel, said second predetermined torque greater than the first predetermined torque.

[c30] A method as recited in claim 29 wherein the first predetermined torque comprises a positive torque.

[c31] A method as recited in claim 29 wherein the first predetermined torque comprises a negative torque.

[c32] A method as recited in claim 24 further comprising determining a lock position in response to a pressure in a steering system.

[c33] A method as recited in claim 24 further comprising determining a lock position by measuring a relief pressure.

[c34] A method of controlling an automotive vehicle comprising:
generating a first wheel speed signal;
generating a second wheel speed signal;

generating a third wheel speed signal;

generating a desired wheel speed for the first wheel based on the second wheel speed signal, the third wheel speed signal and the fourth wheel speed signal; and controlling the first wheel speed to the desired wheel speed to reduce a turning radius of the vehicle.

[c35] A method as recited in claim 34 further comprising generating a fourth wheel speed signal and wherein generating comprises generating a desired wheel speed for the first wheel based on the second wheel speed signal, the third wheel speed signal and the fourth wheel speed signal.

[c36] A method as recited in claim 34 wherein controlling the first wheel speed comprises braking the first wheel.

[c37] A method as recited in claim 34 wherein controlling the first wheel speed comprises applying a predetermined torque to the wheel.

[c38] A method as recited in claim 37 wherein the predetermined torque comprises a positive torque.

[c39] A method as recited in claim 37 wherein the predetermined torque comprises a negative torque.

[c40] A method as recited in claim 34 wherein generating a

desired wheel speed comprises generating the desired wheel speed in response to a traction control system.

[c41] A method as recited in claim 34 wherein generating a desired wheel speed comprises generating the desired wheel speed in response to an anti-lock brake system.